

The Cardinal at Dinner by David Berlinski  
[from "The Advent of The Algorithm"]

Dinner was over. The great table had been cleared of plates, each with a blue-and-green Vatican crest, and its heavy napery. The room glowed with a soft, red light thrown from the fluted wall tapers. A warm blue haze from the pre-Revolutionary Cuban cigars we were all smoking drifted upward, collected itself into a little cloud, and then was whisked away by the room's efficient but unobtrusive ventilation system. The cardinal shifted his ample haunches underneath his red robes, the better, he remarked, to ease the flaming sciatica that traveled from his hips to his ankles. He sipped at the Benedictine that his servant had placed before him; it had been laced with a few drops of valerian to ease the discomfort of his back. I could see the great wave of sleepiness that came over him, but with an act of mental discipline that I imagined years had made habitual, he resisted the impulse to close his eyes.

"My dear Professore Dottore," he said suavely, nodding toward a tall man sitting at the table's far end, "it is now that you must tell us how the world began."

The professore dottore, who was, in fact, a powerful and well-known physicist from the University of Turin, cleared his throat and began to speak in a soft, high tenor. He had clearly prepared his remarks well in advance and he said what he had to say in a kind of florid and old-fashioned German very much at odds with the Viennese dialect that the cardinal (and everyone else) spoke. "As you know, Eminence," he said, "it has been mathematical physics that has embodied the largest, the most generous, intellectual gesture of the past five hundred years."

The cardinal nodded gravely, as if to say that that was certainly so.

"Within the scheme that it elaborates, real numbers are assigned to continuous magnitudes. Time and space are given a quantitative skeleton." The professore dottore paused to look at the men sitting around the table and placed his hands before him on the table and pressed them downward; I noticed somewhat to my surprise that they were trembling just slightly.

He said, "It is a characteristic and artful method of investigation that has been developed, one in which things and processes are described by mathematical equations. It has allowed us to survey the universe from the big bang to the end of time."

"That is very elegantly put," said the cardinal, "but I was under the impression that general relativity and quantum mechanics are yet in conflict. These are the two great visions of your science, no?"

The professore dottore nodded vigorously. "You are correct, Eminence," he said. "In general relativity, space and time are fused into a manifold. Matter deforms space and time, and space and time influence the behavior of matter."

"And the other," the cardinal asked, "quantum mechanics?"

"It is in certain respects a dark subject, Eminence."

"Quantum mechanics a dark subject? It is a good thing that you never take confession, my friend."

A number of men at the table saluted this sally with deep throaty chuckles.

"A figure of speech, Eminence," said the professore dottore.

"Instead of particles, there are waves of probability, which launch themselves throughout the whole of space."

"Ah," said the cardinal, who had in his student years in Verona in fact studied quantum mechanics under a physicist who had himself studied with Enrico Fermi. "I remember. Waves behave like particles and particles behave like waves, and solitary photons passing through a slit manage to interfere with themselves."

"Yes," said the professore dottore.

"Extraordinary. And to think there are those who make fun of our poor Church because of the miracle of transubstantiation." The cardinal paused to collect himself and then smiled. "Two entirely different disciplines, no? And yet you assume that beneath it all the universe is simple."

"We are searching, Eminence, for the final unified theory."

"And when you have found it?"

"The physical aspects of reality will be subordinated to a single law of nature."

"And this great theory, what will it teach us about the universe, its meaning?"

The professore dottore inserted his index finger beneath his shirt collar to loosen it slightly.

"The more the universe seems comprehensible, Eminence," said the professore dottore, "the more it seems to have no meaning."

"And you are persuaded that it does seem comprehensible?" the cardinal asked. He no longer looked the least bit sleepy.

The professore dottore smiled indulgently. "Evidently," he said, "there are the laws of physics."

The cardinal placed his heavy peasant forearms on the table in front of him. "If the universe is comprehensible, surely that is

evidence that it is not entirely lacking in meaning, no? A meaningless universe would not be comprehensible."

The Professore Dottore for a moment looked down at his hands. When he looked up, he said, "Forgive me, Eminence, but why should it have a meaning?"

"My dear Dottore," said the cardinal, "our question is not \*why\* the universe has a meaning but \*whether\* it has one. Surely we can agree to leave the why of things in other hands." And here the cardinal pointed slyly toward the ornate ceiling of the dining room.

The professore dottore shrugged his thin shoulders; he seemed perhaps a touch vexed, but his irritation had enforced his self-confidence and when he spoke again he spoke in a calm, clear voice and his hands had ceased to tremble.

"As far as we can tell, Eminence, the universe is just a physical system. Nothing more."

"A physical system," said the cardinal, "one entirely explained by the laws of matter."

"Entirely, Eminence."

The cardinal nodded his heavy head again. "And this system," he said, "how did it come to be?"

The professore dottore now looked directly out toward the end of the table, where the cardinal was sitting. "I am sure Your Eminence knows the answer," he said tentatively.

"Yes, of course, but the others," said the cardinal, gesturing with a sweep of his thick hand toward the men sitting at the table, his ring just catching and holding the light.

The professore dottore nodded vigorously, as if to say that he quite understood the need for explanation, given that many men at the table were specialists in other subjects. "The current theory," he said, "is that the universe erupted into existence some fifteen billion years ago."

"The big bang," said the cardinal, with just the slightest suggestion in his voice that he was conveying an absurdity.

"It is what everything suggests, Eminence, the data, our theories, everything."

"Yes," said the cardinal, "but what lies before the big bang? I am asking in ignorance."

"Nothing." "Nothing?" "Nothing. "

"But my dear Professore Dottore, surely this troubles the intellect, no? There is nothing for all eternity, and then – poof - there is something."

The professor dottore shook his head vigorously. "No, no, Eminence," he said. "There was no eternity before. This is a mistake. "

"Ah," said the cardinal, "eternity a mistake."

"I am talking only of science, Eminence," said the professore dottore apologetically. "Space and time were created with the universe. They have no prior existence."

"Then there is no time \*before\* this big bang of which you speak?"

"It seems difficult to grasp, Eminence, but just as there is no point north of the North Pole, so there is no time prior to the big bang."

"Then there is nothing to explain the creation of the universe." The cardinal motioned with his hand to the walls of the great room, heavy with lovely silken tapestries in shades of warm vermilion.

"All of this, this grandeur," he said, "just happened for no reason whatsoever? Is that what you believe?"

"No, Eminence," said the professore dottore, "I believe that ultimately the laws of physics explain the existence of the world."

The cardinal shifted his considerable bulk backward, so that he could withdraw his forearms from the table and rest them on the carved wooden armrests of his chair.

"This you must explain to me," he said. "The laws of physics, they are symbols, no? Things made of man?"

"Well, yes," said the professore dottore, "in a sense that is right. Mathematical symbols. But they are not made by man."

"Who then?"

"I mean," said the professore dottore, "that they are not made at all. They are just what they are."

"Ah," said the cardinal, releasing a stream of air over his full lower lip. "They are what they are."

The professore dottore shrugged his thin shoulders as if to say he was helpless before the facts.

"But whatever they are," said the cardinal, "they are not physical objects, these laws, no?"

"The laws of physics do not exist in space and time at all. They describe the world, they are not in it."

"Forgive me," said the cardinal, "I thought I heard you say that everything in the world could be explained by the behavior of matter, no? It would appear that you meant everything in the world except the reason for its existence."

"Eminence, every chain of explanation must come to an end."

"Is it not convenient that \*your\* explanations come to an end just before they are asked to explain a very great mystery?"

The professore dottore shrugged his thin shoulders once again. Like all of us, he had been warned that the cardinal was a man of prepossessing rhetorical power, and he was, I imagine, still enough of a Catholic not to wish to press his own arguments.

"It would seem to me," said the cardinal, sipping again at his valerian-laced Benedictine, "that if you were serious about this search of yours"-- and here he paused for emphasis so that the entire table hung on his every word -- "that you would be looking for laws that in the end explain themselves as well as everything else."

The professore dottore looked up attentively but said nothing. Neither did anyone else. The blue cigar smoke continued to drift upward; the moment of tension gathered itself and then collapsed, and then the cardinal, with a warm throaty chuckle, said something in his own slangy Italian dialect to the men sitting directly around him, who threw up their hands and laughed. But speaking no Italian myself, I had no idea what he said.

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And so they have gathered by the gates of time, the quick and the dead and those eager to be born. A cool gray fog is blowing. The ancients tell stories of why time began and how space was curved. The spidery hands of the great clock, measuring millennia instead of minutes, are crawling toward midnight. The logicians have gathered themselves together. Aristotle is there and Abelard, and Frege and Cantor, still dressed in hospital white. Peano and Hilbert are talking to one another; Russell is staring at Godel, and Godel is staring into space. Church has risen from his seat; Turing bends

low to catch his breath, and Post pats him upon the back. Then as the hinge of the great gate swings open, Gottfried Leibniz appears at last, his luxuriant wig fluttering in the evening breeze, his arms outstretched toward paradise, and as music fills the air, he begins to dance the slow stately dance whose rhythms signify what has been, what is, and what may come.